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AN
INAUGURAL ESSAY
ON
BLISTERS:
SUBMITTED TO
THE EXAMINATION
OF THE
REV. JOHN EWING, S. T. P. PROVOST,
THE
TRUSTEES & MEDICAL FACULTY,
OF THE
UNIVERSITY OF PENNSYLVANIA,
On the sixth Day of June, 1799,
FOR THE DEGREE OF
DOCTOR OF MEDICINE.

By ROBERT J. KING, OF MARYLAND,
MEMBER OF THE PHILADELPHIA CHEMICAL SOCIETY.

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TO
BENJAMIN RUSH, M. D.

PROFESSOR OF THE INSTITUTES, AND OF CLINICAL MEDICINE,
IN THE
UNIVERSITY OF PENNSYLVANIA.

SIR,

IT is with deference, that I take the liberty of addressing to you the following Essay. Every one, I believe, who has enjoyed the advantage of being your private pupil, will be prompted to pay this tribute of respect to your kind attentions as a friend, and your beneficial instructions as a teacher.

Amongst the number of those, who have requested your protection of their first medical attempts, there are many, whose talents are far more deserving of your patronage, than mine can pretend to be: but none, Sir, ever felt more affection for your private virtues, or more respect for the public services that you have rendered to the cause of medical science, than

Your devoted humble servant,
ROBERT J. KING,

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ESSAY ON BLISTERS.

WHEN cantharides are applied to any part of the surface of the body, the skin becomes inflamed, and in the course of a few hours, there is a preternatural discharge, from the excretory ducts of the capillaries. This discharge being accumulated between the cuticle and cutis vera, is called blister. A similar evacuation of fluid, may be produced by other acrid substances, such as raphanus rusticanus, sinapi, and many others. But no experiments hitherto made, have been attended with such advantage, as to entitle them to such general use as the cantharides; and they are seldom had recourse to, except when the flies can not be obtained, or where in consequence of the extreme torpor of the system, they have been ineffectual.

On referring to the ancients, we find, that they were not entirely ignorant of the powerful effects of blisters; although their application was confined to very few diseases. The Arabians are said to have first used them, with a view to rouse their patients from a lethargic or apoplectic state. The physicians

that succeeded them, for some time used them indiscriminately in every state of morbid action in the system, and according to their individual success, or the want of it, were split into two factions, the one recommending them in every state of disease, the other condemning them, as not only inefficacious, but always injurious. From an ignorance of the proper period, in which they were indicated, it frequently happened, that they did great injury, by too early an application; in consequence of which their advocates gradually diminished; until a dispute, between some Italian physicians, relative to their use in a plague, which prevailed in the sixteenth century, interested the medical world so far, as to put their efficacy to the test, by applying them, under all the different circumstances and states of the disease. From the number of experiments, they made, they were better ascertained of the proper time of using them with advantage; and indeed to this dispute we may attribute in great measure our knowledge of the efficacy of blisters, and the extensive application they admit of. But their application can not be considered as yet regulated in all cases, for even now, they are often prematurely applied, and seldom without manifest injury to the patient.

The necessity of attending to the state of the system, before we prescribe a remedy, does not re-

quire a better and more convincing illustration, than in the application of blisters. This principle, which is inculcated with so much ardour, by the learned and ingenious professor of the institutes of medicine, in the university of Pennsylvania, is the source upon which the whole art of alleviating and curing diseases, is founded, and as such should never be forgotten by a practitioner of medicine.

The manner in which blisters operated, occasioned much difference of opinion amongst physicians. One party maintaining that an absorption of the cantharides took place, and that all their good effects were derived from this source. The other asserted, that their action was by revulsion only. The principal fact which led to the foundation of the former opinion, was, their observing strangury to be produced, both by the internal exhibition, and external application of cantharides, and that a remission of disease generally succeeded sooner, when the blisters operated so as to produce strangury. This fact they conceived sufficient, to establish their efficacy on an absorption of the acrid particles of the cantharides. That some part of the cantharides, is sometimes taken into the system by means of the absorbents, is very certainly proved by the phenomenon of strangury. The absorbed part appears to be particularly determined to the urinary organs, producing by its irritating action,

inflammation on the neck of the bladder, and consequently pain and disuria. There is nothing repugnant to reason, nor any deviation in the laws of physiology and pathology, in the cantharides operating particularly on the organs of urine. Daily practice exemplifies the specific action of certain medicines, such as mercury, taken in, by any manner, operating particularly upon the throat, of garlic, being specifically determined to the urine, and many others. But we will find this supposed absorption, very deficient in the explanation of the operation of blisters. The opinion, that an alteration was produced in the blood by the subtle salts of the cantharides, originated when a lentor in the blood was conjectured to be the cause of disease, and was supported as such, by Baglivi, Huxham and some others. But the ingenuity and judgment of later physicians, have long since condemned to oblivion the theory of disease consisting in a lentor of the blood, and have reared, an explanation, of the operations of the laws of physiology and pathology, on the foundation of experience, judgment and truth. The belief of the efficacy of blisters depending upon an absorption of the flies, was consequently exploded, as being too erroneous to be countenanced, after the theory upon which it was founded was overthrown. I therefore presume it will be unnecessary to introduce any arguments to controvert an opinion so opposite to reason and understanding. The opi-

nion of their operating by revulsion, although not sufficient to account for all their advantages; has some foundation in observation and truth. Dr. Cullen tell us, “ that the evacuation occasioned by blistering, is never so considerable as to affect the whole system, and therefore can neither, by sudden depletion, relax the sanguiferous vessels, nor by any revulsion, affect the general distribution of the fluids.”* This is undoubtedly verified in practice, as in fevers where there occurs no local morbid determination, the application of blisters is seldom attended with service, from the evacuation which they produce, as it is generally so inconsiderable as not to occasion much diminution of the force and frequency of the pulse. They are only used in diseases of general action, when the violence of the morbid action is so reduced by evacuations, as to be transcended by the local inflammation and pain of a blister, or where they may be had recourse to, as stimulating, as in the typhus state of fever. But in fevers, with any local morbid determination, their operation may, with some propriety, be called revulsive; as the irritation which they cause on the skin, occasions a preternatural determination of blood to that part, and consequently an effusion, which seldom fails of relieving the deeper seated inflammation. But as it frequently happens, that they are successful, without necessarily depending on revul-

* Cullen's first lines. Vol. I. page 283.

sion, I shall proceed to mention their mode of operation.

First, They are powerfully stimulant. We infer this, from the increased force and frequency which is produced in the pulse, and from the great determination of blood to the part, which is in contact with the flies, occasioning inflammation and effusion.

Secondly, The evacuation which they produce, often counterbalances the effects of their stimulating power: hence, their service in the hydropic state of fever, and in local inflammation and congestion.

Thirdly, The new impression which they make is frequently greater than that of the disease; and as no two impressions of unequal force can exist at the same time, the weaker yields to the stronger. —We have this illustrated in their operation in diarrhea, rheumatism, &c.

And fourthly, When the local morbid action which they create is not violent enough in degree, to translate the disease, the irritation which they produce, when applied to the extremities, gives a centrifugal determination to the disease; thereby saving parts essential to life; as in the yellow fever, gout, &c.

From this view of the operation of blisters the reader must be struck with the useful and extensive application which they admit of; that their operation is both stimulant and sedative, and that they answer the purpose of a metastasis, better than any medicine in use. There are no diseases in which blisters may not be serviceable if applied at the proper time. Dr. Rush tells us “it is from ignorance or inattention to the proper stage of fevers in which blisters have been applied, that there have been so many disputes among physicians respecting their efficacy. When applied in a state of great arterial action they do harm; when applied after that action has nearly ceased, they do little or no service.” I have called the period in which blisters are useful, the *blistering point*.*

We find that strangury in consequence of blisters, is considered by Dr. Rush as favorable; and practice confirms the opinion, for we generally observe a remission in the disease immediately to succeed. Dr. Clerk and Dr. Whytt informs us, that a strangury produced by blisters is very successful in removing a fit of the gout.† The operation of strangury in fevers of high grade, such as yellow fever and gout, is founded precisely on the same principle, as the removal of the intermittent fever, by the

* Rush's works, Vol. IV. page 93.

† Physical and literary essays, Vol. III. page 469.

inflammation produced by a pair of epispastics to the wrists. In fevers of a high degree of morbid action, the local action occasioned by blisters to any part of the surface of the body, is not sufficient in force, to produce a transcendancy over the original disease, and they are ineffectual, until depletion has reduced the action in the system. But if part of the cantharides be taken in, by the absorbents, in such quantity as to produce so great a degree of inflammation, as to occasion a suppression of urine, we observe an immediate remission of fever. The extreme sensibility of the coats of the bladder, where the flies excite much greater action than on the skin, is the cause to which this favorable effect must be attributed.

The diseases, in which blisters should be applied, divide themselves into general and local. I shall first take a view of the general diseases, and point out the time where the application of blisters is proper. Conceiving Dr. Rush's arrangement of the states of fever, to be the most eligible, I shall take the liberty of following his order.

In the malignant state of fever, which appears in the plague, yellow fever, hydrophobia, gout, and natural small pox, blisters may be applied to the extremities, after the morbid action has been in some measure reduced by plentiful evacuations.

The determination which they produce to the surface, often prevents congestion and inflammation, in parts essential to life. They have been used in the plague with great advantage, as the irritation they occasioned invited the disease to parts not absolutely necessary to the vital functions, and thereby prevented the too often fatal consequences of congestion in the viscera. Of the good effects of blisters in the yellow fever, I beg leave to transcribe a passage from Dr. Rush's treatise on that disease, as his judicious and successful practice must entitle any remedy used by him, to respect. Blisters, says the Doctor, when applied at a proper time, did great service in this fever. This time was, when the fever was so much weakened by evacuations, that the artificial pain, excited by the stimulus of the blisters, destroyed, and, like a conductor, conveyed off, all the natural pain of the body. The effects of blisters were as follow :

First, They concentrated like a salivation all the scattered pains of the body, and thereby,

Secondly, Reduced the pulse in force and frequency.

Thirdly, they instantly checked a sickness at the stomach and vomiting ; and

Fourthly, They often induced a gentle moisture

on the skin. I found it of little consequence, to what part of the body the blisters were applied; for I observed a pain in the head, and even delirium, to be as speedily and certainly cured by blisters to the wrists, as they were, by a large blister on the neck.*

I have had an opportunity of witnessing the inestimable advantages of blisters, in many cases of yellow fever, in which they were prescribed by my preceptor. They were never ineffectual in immediately checking the vomiting, which is so very distressing in some stages of this fever, and removing the irritability in the stomach, which often is so great as to prevent the retention of any thing. Blisters and cataplasms of mustard and onions, were often used with success, in rousing patients from that great state of indirect debility, which usually appeared on the fifth or sixth day of this fever, when sufficient evacuations had not been made. There occurred very few cases of this fever, in which the pulse did not indicate the application of blisters. Of their use in hydrophobia, gout and natural small-pox, I shall defer speaking, till our order brings us to their distinct states.

In the typhus, or low chronic state of fever, blisters may be applied as stimulants, with considerable advantage. To obtain this to the greatest extent,

* Rush's works, vol. IV. p. 93—94.

they must be small and repeated, and never suffered to discharge long; as the evacuation would counteract the purpose for which they are intended.

In the typhoid, or slow nervous fever, Dr. Huxham used them with advantage; and from their operation in other states of fever, we can entertain no doubt of their application being attended with efficacy in this.

In the synochula fever, blisters are particularly advisable, as the morbid action in the blood-vessels is not so great as to render them injurious, nor so weak as to make them inefficacious. In this state of fever, as in all others where no local inflammation occurs, they should be applied to the wrists or ankles, as being more easily secured, and dressed with less inconvenience, than when applied to any other part of the body. The local inflammation, which they create when applied to the extremities, is generally more serviceable in removing disease, than when applied to the back of the neck. This probably may be owing to their translating the disease to parts, at a greater distance from the organs necessary to the vital operations.

The hectic fever, Dr. Rush informs us, appears in a variety of forms, it being occasionally synochoid, typhoid and typhus. In this state of fever, blisters

are almost always proper, yet they should never be applied without first consulting the state of the pulse, and being well assured, that it is at the *blistering point*.

The inward fever of the southern states, which is produced by the feeble action of marsh miasmata operating on the system, when failing to yield to the bark, may always be cured by the application of blisters to the wrists.

The intermittent fever, is sometimes so obstinate, in consequence of marsh miasmata producing so great a degree of action in the system, that the bark has been found inefficacious, and in many cases extremely injurious. When such cases occur, the pulse is found to be moderately tense. By premising blood-letting, or the abstraction of the excitement from the blood-vessels to the surface, by blisters to the wrists, the bark will always be found effectual. Dr. Rush, in speaking of intermittents, observes, “that in the autumnal intermittents, whether quotidian, tertian or quartan, in which the bark did not succeed, after three or four days trial, he has seldom found it unsuccessful after the application of blisters to the wrists.*”

* Vide Rush on bleeding and blistering in intermittents. Vol. I.

Our author, also, in his account of the bilious yellow fever, as it appeared in the summer and autumn of 1780, speaks of the efficacy of blisters in the following manner: “if the fever continued beyond the third or fourth day, without an intermission, I always had recourse to blisters. Those which were applied to the neck, and behind the ears, produced the most immediate good effects. They seldom failed of producing an intermission in the fever, the day after they were applied. Where delirium or coma attended, I applied a blister to the neck the first day of the disorder.” Lind observes, that whenever a hot fit of an intermittent was protracted to an unusual length, and accompanied with alarming symptoms, he applied a blister to the back with evident advantage.* Where there is no delirium, or considerable pain in the head, it will be more proper to apply them to the wrists, as they can be better confined, and dressed with more convenience; and their efficacy is equally as speedy and certain, as when applied to the neck or back.

The Intestinal state of fever, seldom appears without indicating the application of blisters. The sympathy or intimate connection, which is so often manifest between the surface of the body, and the

* Lind on hot climates, page 290.

lungs, stomach, and intestines, induced Dr. Rush, in his division of the body into systems, to consider the membrane which covers the lungs, and lines the intestinal canal, as a continuation of the external skin, and of course as one system. Hence we can easily conceive, how important and useful the application of blisters must be, in affections of the stomach and intestines, of which we have daily proofs in their immediate removal of nausea and vomiting, and relieving the pain and griping which occur in dysentery and cholic. The Intestinal state of fever is divided by Dr. Rush, into colera morbus, diarrhea, dysentery, and colic. I shall speak of the proper time and place of using blisters in each of these affections. 1st, In colera morbus. The extreme convulsion, in the stomach and intestines in this disease, which manifests itself in nausea, vomiting and purging, may almost always be removed, by applying blisters to the wrists or back. We should be guided by the action in the pulse, as to the time of using them; but this is seldom found so considerable, as to prohibit the immediate application of them, if the vomiting and purging should be very distressing. 2dly, In diarrhea. The morbid action in the blood-vessels in this disease, is seldom, if ever, violent enough, to contra-indicate the use of them. They should be applied to the wrists in general, as the new stimulus which they produce, is often sufficient to effect

a translation of the excitement from the intestines; but in old chronic cases, where the force of habit is very great, the action, which is produced by blisters to the wrists, is frequently too feeble, and we are obliged to expose a larger surface to their stimulus, by applying them both to the wrists and ancles. The metastasis of action, which is caused by them, has often been found effectual in curing diarrhea, after astringents had been used without success. 3dly, In the dysentery, or febris introversa of Dr. Sydenham, when after proper evacuations having been *pre* mised, the pain, griping, and tenesmus, do not cease, blisters should be applied to the abdomen or ancles. By diverting the pain and inflammation from the intestines, they never fail to relieve these troublesome and distressing symptoms. From their manner of operating, they must have a very decided superiority over opium: as the exhibition of a medicine possessed of such powerful stimulating qualities, must generally be attended with inconvenient, if not dangerous, consequences, in a fever of so high a grade of inflammation, as the dysentery. I hope it will not be inferred from this, that I consider opium always injurious in dysentery, for certainly there are cases, in which the morbid action is so feeble, as to be transcended by the stimulus of the opium, and consequently cured; but these seldom occur, and very great caution should attend the use of so active a medicine. Blisters do not appear to be re-

quisite in the commencement of this disease, as the pulse and constipation of the bowels render blood-letting and purging more essential. But if, after the activity of the pulse has been reduced, and evacuations procured by cathartics, the griping and tenesmus should continue, blisters should be applied as I have previously observed; and 4thly, In the colic. In this, as in every other state of fever, the pulse must be our guide. If it should be tense, and great degree of pain be felt in the intestines, blood-letting should be first performed, and afterwards a large blister be applied to the abdomen. But if the action in the pulse is not very great, we should immediately apply a large epispastic to the abdomen. Other remedies, which a knowledge of the state of the system will suggest, must not be withheld, as the impropriety, of depending upon one medicine, in all the variations which morbid action may assume, must be evident to every practitioner.

The next state of fever in order, is the Pulmonary, in which is included, pneumonia, vera, notha, pneumonacula, or phthisis pulmonalis, and catarrh. I shall therefore proceed to speak of the efficacy of blisters in each of these affections separately. 1st, In pneumonia vera. The efficacy of blisters in pleurisy, has been sanctioned by every author, who has written a treatise on the disease. Some difference of opinion relative to the most proper period

of applying them, has existed among physicians. Dr. Rush informs us in his lectures, that the immediate application of them, is necessary, if the pain is very severe, and respiration difficult, without waiting for a reduction of the arterial action to the blistering point. Sir John Pringle speaks of them in the highest terms in pleurisy: he says that the disease taken at the commencement, may often be cured by one large bleeding, and a blister laid to the side affected.* They afford relief, by removing the internal inflammation, to the surface of the body, and there creating an artificial disease, less injurious in its nature, than that, for which they are made a remedy. In the latter stage of pleurisy, when the pain is severe, with so feeble morbid action in the pulse as to endanger further blood-letting, blisters have been used with no less success, than when applied at an earlier period. 2dly, The pneumonia notha, is accompanied with such an immoderate determination of blood to the lungs, that the most immediate and powerful remedies are required, to prevent the threatening suffocation. Copious bleeding, and the application of blisters to the thorax, are the only remedies capable of freeing the patient from this painful and oppressive disease.

3dly, In phthisis pulmonalis, they may be used with very good effects, to relieve the cough, when the

* Vid. his army, page 145.

action in the pulse is not very great. The fixed pain in the breast is often translated to the external parts, by applying a large blister to the sternum, after the arterial action has been reduced to the blistering point. Dr. Rush observes, that, “blisters and issues, by determining the perspirable matter from the lungs to the surface of the body, lessen pain and cough.”* Where there is not very great pain in the breast, every advantage will be derived from their application to the wrists. And 4thly, In catarrh. The morbid action in this disease is not unfrequently so feeble, as to render the application of blisters unnecessary. But whenever the phlogistic diathesis, which is always more or less present, is so considerable as to occasion pain in the breast, and difficulty of breathing; blisters should be applied to the thorax, after blood-letting, with a view of restoring the determination of the fluids to the surface of the body.

We next proceed to speak of the good effects of blisters, in the Anginose state of fever, which includes all the affections of the throat, known by the names of cynanche, tonsillaris, porotidea, maligna, scarlitina, and trachealis. 1st, Of their use, in cynanche tonsillaris. The morbid action in the blood-vessels in this fever is seldom so great as to preclude the immediate application of blisters, if

* Rush's works, Vol. I. page 141.

the inflammation in the tonsils, occasions much pain. They should be applied to the fore part of the neck, as producing the most speedy good effects. 2dly, In cynanche parotidea. This fever is frequently attended with a considerable inflammatory diathesis, and so great a determination of blood to the parotids, as to produce great pain and inflammation. Blood-letting and blistering, according to the force of the pulse and degree of local inflammation, should be used. Blisters may be applied with the greatest advantage, to parts contiguous to the parotid glands, and should be stimulated to discharge, by being dressed with unguentum vesicatorium, until the disease is removed. Dr. Cullen advises the use of blisters, to bring back the swelling, when it has been translated to the testicles.* 3dly, In cynanche maligna, they may be applied to different parts of the neck; but not until the action in the system, which is often very great, is partly reduced by one or more bleedings. They are generally very successful in removing the pain and soreness, by diverting the inflammation from the internal fauces, to the external parts. 4thly, In the cynanche scarlitina, they may be used with all the advantages that have been mentioned in the other states of anginose fever. Dr. Rush tells us, that “every case which did not yield to the usual remedies, before the third day, he applied a blister behind each ear, or to the back

* Vide Cullen's first lines.

of the neck, with good effects."* And 5thly, In the cynanche trachealis. The dangerous consequences of this disease, is often prevented by early bleeding and blistering. Blisters should be applied over the part affected, as the new action and consequent evacuation, which they cause, on the neighbouring external parts, is more immediate in relieving the inflamed vessels of the trachea, than when they are applied to parts remote from the state of inflammation.

The Rheumatic state of fever succeeds next in the order, which we have attempted to follow. This comprehends both the acute and chronic rheumatism. Of the efficacy of blisters in both of these states, I believe every practitioner can testify. In acute rheumatism, where there is great local inflammation, attended with extreme pain, blisters, after blood-letting, should be applied to the affected part. They never are unsuccessful in removing the pain from the joints; which good effect must be ascribed to their producing a new action on the skin, which is more violent than the inflammation seated within the joint; and probably the evacuation, which they occasion, contributes in some measure to relieve the inflammation of the ligaments, by lessening the quantity of the determined fluids to the part. Dr. Cullen advises their application to

* Rush's works, Vol. I. page 107.

the pained part.* Dr. Huxham observes, “ that in such parts where the pains continued obstinately, he applied blisters and fomentations.”† The chronic rheumatism, which generally is accompanied with a synochula pulse, often requires the use of blisters. They are particularly serviceable in this fever, as the pulse is at a proper degree of action, to be subdued by them. Hence they are always serviceable, by converging the scattered pains of the body, and conveying them out of the system; also by abstracting the irregular action from the blood-vessels, and concentrating it in the skin. They may be applied to the wrists or ancles in general; but if there be great pain in any joint, attended with stiffness, more immediate advantage will be obtained from their application to the part affected.

In the arthritic state of fever or gout, blisters, by determining the inflammation to external parts, often prevent morbid congestion, from taking place in the viscera. “ Blisters,” says Dr. Rush, “ are an invaluable remedy in this disease, when used at a proper time, that is, after the reduction of the morbid action in the system, by previous evacuation. They should be applied to the legs and wrists in general gout, and to the neck and

* Cullen's first lines, vol. II. p. 31.

† Huxham on air and epidemic diseases, vol. II. p. 264.

fides, when it attacks the head or breast.”* I have spoken in another place of the effects of strangury, in this disease.

In the maniacal state of fever, as in all other states of morbid action, we must be directed by the action of the blood-vessels, as to the proper period of using them; for the application of them, when the system is very highly excited, or too enfeebled, would not be attended with advantage, but on the contrary with very great injury. Dr. Cullen recommends their application to the head, after being shaved. He observes, “that they take off the excitement from the subjacent parts, and in recent cases have been found useful by inducing sleep.”† Dr. Rush advises blisters to the extremities, in tonic mania, in preference to the head or neck, as the revulsion, which they produce to the wrists, seems more serviceable, by removing the excitement at a greater distance from the brain, than when applied to the head or neck.

In the apoplectic, phrenitic and lethargic states of fever, blisters may be applied to the head or neck with advantage. We must consult the state of the system, and bring it to the point proper for their application, by evacuation. But I think the immedi-

* Rush's work, vol. iv. p. 174.

† Cullen's first lines, Vol. IV. p. 15.

ate use of them, in either of these states of fever, may be attended with efficacy, as they will have a tendency in some measure to relieve the fulness of the vessels of the brain, by the evacuation which they occasion ; and will by no means preclude the beneficial remedy of blood-letting.

In the paralytic state of fever, they are often serviceable, when applied to the limb or part affected.

In the hydrocephalic state of fever, they should be applied behind the ears, or to the back of the neck. If used before effusion has taken place, they generally prevent it, by producing a determination of the morbid action to the skin, and an evacuation which seldom fails to remove the phlogistic diathesis : but even when we have reason to suppose that effusion has taken place in the brain, they should be used, as the discharge they occasion often relieves the brain from the pressure of the effused fluid. The blisters should be dressed with unguentum vesicatorium, in order to keep up the discharge.

In the nephritic state of fever, the violent degree of pain is often instantly relieved, by laying a blister on the back. The engorgement or choaking of the vessels of the kidneys, which Dr. Rush describes as frequently occurring in fevers of high grade, in which the urine is totally obstructed, so that the

bladder yields no water to the catheter, is generally removed by blood-letting and a large epispastic to the small of the back.

I come next to the hydropic state of fever. In anasarca they should be applied to the legs or wrists, when the pulse indicates them, by its gentle force and frequency. Some danger of mortification is apprehended by some physicians, from their use in this disease. They may induce gangrene if applied when the system is in a state of great debility; but this is never to be dreaded by physicians, who are always regulated by the action in the system, as to the proper period of using a medicine. The new action, which is produced by their stimulus, abstracts the irregular action from the blood-vessels, and determines the effusion to the newly created disease. In hydrothorax and ascites they are not generally of any service, and consequently are seldom applied.

We next consider the eruptive state of fever, which comprehends, the small-pox, the measles, and the chicken-pox. In the inoculated small-pox, the system is so well prepared by an antiphlogistic regimen, that blisters are seldom or ever necessary; but in the natural small-pox, the inflammatory symptoms run so high, that blisters are often indicated. We find that Huxham, Lind and Cullen had recourse to them whenever the violence of the disease was great.

Dr. Cullen informs us, that “ in a violent disease, from the eighth to the eleventh day, it is proper to lay on blisters successively, on different parts of the body, and that without regard to the parts being covered with pustules*.” When there is a great morbid determination to the fauces, which renders deglutition difficult, the saliva viscid, and with difficulty thrown out, it will be necessary to apply blisters to different parts of the neck, in order to divert the inflammation from the internal parts. In the measles, the morbid determination to the lungs, causing pain, cough, and difficulty of breathing, may be relieved by laying blisters on the thorax, after blood-letting has taken down some of the morbid action. The chicken-pox is attended with such moderate febrile symptoms, as seldom to make the application of blisters necessary: but if cases occur in which the inflammatory diathesis runs high, blood-letting and blistering must be resorted to, as being equally efficacious, as in other states of fever.

In the amenorrhagic state of fever, the preternatural fulness and quickness of the pulse, call for evacuations. Blisters, after blood-letting, should be applied to the ancles, or inside of the thighs. The irritation they occasion, produces an increased determination of blood to the lower extremities, and some effusion, which seldom is ineffectual in lessening

* Cullen's First Lines, vol. II. page 167.

the activity of the pulse, and restoring the natural evacuation. They are far preferable to any of the class of medicines known by the name of emagogues.

The hepatic state of fever succeeds next in order. Blisters to the right hypochondriac region, when combined with blood-letting and mercury, are very successful. They are serviceable, by the artificial disease, which they create, abstracting the morbid excitement from the liver, and thereby preventing the distressing consequences of suppuration.

The hysterical and hypochondriacal states of fever, are not unfrequently accompanied with such force of action in the blood-vessels, as to constitute the blistering point. They should in such cases be applied to the wrists. The artificial action they produce, abstracts the excitement from the blood-vessels, and by diverting the attention from the melancholy subjects, the train of gloomy associations is broken of.

In the waking or watching state of fever, blisters are recommended by Dr. Rush. They may be applied to the wrists. By abstracting the excitement from the blood-vessels of the brain, and fixing it in the skin and muscles, they often induce sleep.

In the coldness, which sometimes attends fevers,

Dr. Darwin recommends blisters to be applied.* They certainly must be effectual, by equallizing the excitement; upon the unequal distribution of which the coldness depends.

In the jactitatio, which occurs in fevers of high grade, blisters may be used with great advantage. Dr. Rush used them in this tossing or restless state, which very often occurred in the yellow fever of 1797, with the most immediate happy effects. Having enumerated the different general diseases, in which the application of blisters may be attended with advantage, and pointed out the time and place for using them, I shall proceed to speak of some infantile diseases, in which they may be applied with success, and afterwards shall mention their efficacy in local affections.

The whooping cough is among the most distressing and dangerous diseases, to which children are subjected. The morbid action is generally so violent, as to require blood-letting and blistering to a considerable degree. To obviate or remove the inflammatory determination to the lungs, blisters should be applied to the thorax, as being more efficacious than when applied to distant parts. Dr. Cullen tells us “that issues have not so much effect, and should by no means supersede the repeated blister-

† Vide Darwin's Zoonomia, on diseases of sensation.

ing that may be indicated.*” This disease often continues a long time after the contagion has ceased to act, and that from the power of habit alone. They should always be used in this case, as never failing to destroy the force of habit, by the new disease which they produce. Strangury, produced by blisters, has been attended with an immediate removal of cough in this disease. Some physicians, from noticing this fact, were led to administer small doses of tincture of cantharides, till a strangury was brought on. It never fails of relieving instantly the cough ; but this certainly cannot be a very eligible method of cure, as more dangerous consequences are to be apprehended from strangury, than from the original disease. Blisters to the thorax or wrists, will have as much efficacy as a strangury, unless where the morbid action in the blood-vessels is so high, as not to be transcended by the local inflammation of the blisters. In such cases, blood-letting must be practised until the system is reduced to that point, in which blisters will surpass the violence of the action, and thereby produce a remission.

In colera infantum, blisters when applied to the wrists, or over the stomach, are very effectual in removing the sickness at the stomach and suppressing the diarrhea. Their efficacy is more certain in

* Vide Cullen on Chin Cough.

this disease, when combined with the pure air of the country.

The fever, which is sometimes brought on by the irritation of the gums in dentition, is often cured “by a blister to the back of the neck, or one behind each ear, after evacuations have been made.”* In short, blisters may be used in every case of fever, in childhood, with great advantage. The difficulty of getting blood from them, and of exhibiting sufficient doses of medicines, renders epispastics, not unfrequently, the only remedy to be depended on. The irritability of the skin in children, is so great, as to make the unguentum vesicatorium, of the Edinburgh college, sufficiently active to produce a blister. Hence, it would be very improper to use the emplastrum epispasticum, as being more active, it would produce ulcers, which might be the cause of much injury and distress to the patient.

I now proceed to speak of the efficacy of blisters in local affections.

Some people are often affected with severe pain in the head, without any morbid action being perceptible in the blood-vessels. This may always be relieved, by applying a blister to the back of the neck.

* Vide Zoonomia, vol. II. page 37.

In ophthalmia, they may be applied to the temples with advantage.

In amaurosis, Dr. Darwin observes, that a blister should be applied to the crown of the head.

In otalgia, whether accompanied with febrile symptoms or not, blisters may be applied behind the ears, or ear affected, with immediate good effects. They should always be applied, when the pain is violent, as they abstract the inflammation, from the internal parts, and prevent a suppuration, which might occasion a want of hearing.

In local pains in the limbs, they may always be used with advantage, as never failing to concentrate and transmit them out of the system.

In nausea, whether in consequence of irritability of the stomach, or the effect of fever, blisters may be applied to the back or wrists, with evident advantage.

In schirrus, and all indolent tumors, they may be applied to the part affected with very good effects. The stronger and healthy action which they create in the skin, generally succeeds in removing the disease.

In swelled testicles which sometimes occurs in gonorrhæa, they may be applied to the back with certain efficacy.

They have been used in the white swelling of the knee, with considerable advantage. Bell recommends them to be applied alternately on one side and the other, and to be dressed with issue-ointment, in order to keep up an evacuation.

The manner of forming a plaister, to act with the most speed and success, the method of applying, cutting, and dressing blisters, and the prevention of strangury, with the best way of treating it, should it occur, are all subjects necessary to be acquainted with.

We find, in the London and Edinburgh pharmacopias, two ways, although not materially different in their operation of preparing the emplastrum cantharides. The London pharmacopia directs us to take—

Spanish flies, one pound; plaister of wax, two pounds; prepared hogs' lard, half a pound.

Having melted the plaister and lard, a little before they coagulate, sprinkle in the flies, reduced to a very fine powder.

The Edinburgh college differs from the London in the following manner:

Take of hogs' lard, yellow wax, white rosin, cantharides, each equal weights : pound the flies into a fine powder, and add them to the other ingredients, previously melted, and removed from the fire. Both of these formulæ are very well suited to answer the intention in view, that of exciting blisters, for they are of a proper consistence, and sufficient degree of tenacity, which are the only requisites, if the flies are good. So that whenever we are unsuccessful in our attempts to excite blistering, the default must be ascribed to a want of activity in the flies, or to an absence of sensibility in the skin. Either of these preparations may be used, for the purpose of blistering ; but a plaister made by laying as much of the powdered flies, on a thin spread plaister of basilicon, as the ointment will retain, is found to answer the purpose of exciting a blister, sooner than the emplastrum of the Edinburgh and London colleges; and is prepared with less difficulty and time. This plaister may be secured by straps of sticking plaister, when bandages cannot be used. Before the application of a blister, the part to which it is to be applied, must be well rubbed with warm vinegar, as it has been found to render the flies more speedy and active.

The length of time necessary for the plaister to

raise a blister, must be different according to the quality of the flies, and the sensibility of the skin. In common cases, we have a blister formed from six to ten hours. In children, the flies usually operate sooner, than in the advanced stages of life.

The fluid effused between the cuticle and cutis vera, should be discharged by opening the cuticle with a pair of scissors or a lancet. To prevent further irritation, the particles of flies, which adhere to the part, should be washed off, with warm milk and water. If it be our intention to heal the blisters, they should be dressed with simple ointment; if, to the contrary, it be necessary to provoke the discharge, it may be done by dressing them, with the unguentum vesicatorium of the Edinburgh college; formed by mixing seven parts of basilicon, with three of pounded flies. The small quantity of flies in this ointment, answers the purpose of irritating the tender surface of the cutis vera, sufficiently to procure a considerable evacuation.

Strangury may be prevented, by washing the part with warm milk and water, and by promoting a discharge of urine, with simple drink: but if it should occur as it sometimes does from the long continued application of the cantharides, it may be cured by blood-letting, if the symptoms are violent, by demulcent drinks, and by liquid laudanum.

